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CIVIL CONFLICT AND FORCED MIGRATION: THE MICRO DETERMINANTES AND THE WELFARE LOSSES OF DISPLACEMENT IN COLOMBIA

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Abstract

During the last decade, forced internal displacement in Colombia has been a growing phenomenon closely linked to the escalation of the internal armed conflict - particularly in rural areas. The displacement problem has affected nearly every region and vulnerable groups of the population. Two emerging policy questions are whether the magnitude of the response to this problem has been proportional to its size and to what extent the instruments chosen are the most adequate to address it. The purpose of this paper is twofold. First, to identify the determinants of displacement behavior and to compare these findings with standard migration literature. Second, to estimate the burden or welfare losses of displacement. Empirical evidence shows that the welfare loss of displacement is considerable and amount to 37 percent of the net present value of rural lifetime aggregate consumption for the average household. This loss is estimated for each household with a method that derives welfare changes from behavioral model estimates – widely used in environmental economics. Our empirical findings also show that the level of violence at the origin site is not only the dominant factor of displacement behavior, but also that in a violent environment other migration determinants have the opposite effect, relative to the one expected by the migration literature in a non-violent context. That is, the violent environment modifies the migration incentives for risk aversion, access to information, the planning horizon, and location-specific assets – human and non-human.

Key words: Forced displacement, migration, random utility model, welfare losses.

JEL classification: C35, D74, I39, R23

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CONFLICTO CIVIL Y MIGRACION FORZADA: LOS DETERMINANTES MICROECONOMICOS Y LAS PÉRDIDAS DE BIENESTAR DE LA POBLACIÓN DESPLAZADA

Resumen

Durante la última década, el fenómeno del desplazamiento forzado en Colombia ha exhibido una tendencia creciente, ligada a la intensificación del conflicto armado, en particular en las áreas rurales. El problema del desplazamiento ha afectado la gran mayoría de las regiones y de los grupos vulnerables de la población. Dos preguntas relevantes para fortalecer la política pública han sido ignoradas hasta el momento. En primer lugar, es importante establecer si la respuesta estatal se compadece con la magnitud del problema del desplazamiento. En segundo lugar, se debe explorar si los instrumentos adoptados hasta el momento son los más adecuadas para abordar el fenómeno del desplazamiento. Dado lo anterior, los objetivos de este artículo son identificar los determinantes del desplazamiento, por un lado, y estimar las pérdidas de bienestar de la población desplazada, por otro. La evidencia empírica revela que las pérdidas de bienestar causadas por el desplazamiento son considerables y ascienden a 37 por ciento del valor presente neto del consumo agregado rural de toda una vida. Dichas pérdidas se estiman para cada hogar con un método que deriva los cambios de bienestar de modelos de utilidad aleatoria, usados en la economía ambiental. Asimismo, los resultados indican que la violencia no solo es un factor dominante en la decisión de migrar, sino además modifica los incentivos de los determinantes tradicionales de migración y su efecto es el contrario al esperado. Ello implica que en un contexto de violencia los incentivos tradicionales de la migración, tales como la aversión al riesgo, el acceso a la información, el horizonte de planeación y los activos específicos al lugar de origen, producen el efecto contrario al esperado.

Palabras clave: Desplazamiento forzado, migración, modelo de utilidad aleatoria, pérdidas de bienestar.

Clasificación JEL: C35, D74, I39, R23

Ya no vive nadie en ella, y a la orilla del camino silenciosa está la casa. (...)
los que fueron la alegría y el calor de aquella casa se marcharon para siempre
unos muertos y otros vivos, que tenían muerta el alma.

Melancholic Colombian folk song (Las Acacias)[1]

1. Introduction

Despite the massive global attention international wars attract, today the world faces mostly civil wars (Collier et al, 2003). As a direct consequence, the victims of the conflict are increasingly civil population in contrast to military personnel (Cairns, 1997). Armed groups deliberately target civilians to induce forced migrations because they need the loot to augment resources and to reduce the fighting capacity of the enemy (Azam and Hoefler, 2002). By 2002, due to civil conflicts, nearly 34.8 million people were forced to seek asylum in another country or within the national borders; 21.8 million of them were displaced population[2] (USCR, 2003).

Colombia confronts one of the largest numbers of displaced population in the world. During the last fifteen years, involuntary displacement affected at least 1.8 million and corresponds to 4.3 percent of the country's population and 14 percent of the rural population (Arboleda and Correa, 2003). However, intensification of the political conflict and its expansion to a vast majority of the territory is causing displacement numbers to grow at a larger pace than before. As a result, by 2001, 74 percent of Colombian municipalities were expulsion or reception sites. The toll of displacement falls heavily upon vulnerable groups of the population: women, children and ethnic minorities are respectively 49, 49 and 38 percent of this population (RSS,2002). In fact, in the late 1990's recent migrants

[1] Composed by J. Molina based on poems by Vicente Medina, Spanish poet who wrote about migration and wars during the first half of the 20th century. See, http://www.geocities.com/gsilvam/canciones.htm and http://www.gh.profes.net/archivo2.asp?id_contenido=23944)

[2] The Inter-American Commission on Human Rights (1999) describes a displaced person as anyone who has been forced to migrate within the national boundaries, leaving aside her residence or her habitual economic activities because either her life, her physical integrity or her freedom have been either violated or threatened by situations such as armed conflict, generalized violence, violation of human rights, and any other situation that may alter public order.

(presumably, internally displaced people) fared worse than the urban poor, in clear contrast with the traditional migrant profile, who used to enjoy better welfare than the urban population up to 1995 (see Vélez, 2002, Table 7.)

This paper seeks to address three main questions. First, it establishes whether displacement is a casual by-product of the conflict, therefore it is randomly targeted, or whether displacement is a war strategy and, as such, it is targeted to specific groups of the population. Second, it identifies the key determinants of the displacement process. Understanding the determinants of the process might shed some light on possible policy instruments to mitigate displacement. For example, may the presence of state armed forces outweigh the effect of violence? Are public interventions to provide social services effective to deter displacement? Or displacement can only be halted once the security conditions are restituted to prewar levels? Third, it estimates the burden of displacement in monetary terms. The magnitude of welfare losses is relevant to justify policy interventions and investments. Moreover, the size of public resources to alleviate displacement must take into consideration the extent of welfare losses induced by displacement. By addressing these issues, the paper provides empirical evidence on the behavioral responses of households when confronting violence and on the economics costs violence places upon households.

We find that landowners, young individuals and households with less economic privileges, therefore with a lower capacity to adopt defensive measures, are more likely to be terrorized. Econometric regressions for the determinants of displacement indicate police and military forces assume differentiated roles in preventing displacement. While police presence prevents displacement by reducing the likelihood of victimization, military presence is not instrumental to halt direct victimization of households. On the other hand, military forces can protect the population once violence occurs and displacement is imminent. Welfare losses from displacement are substantial. Compensating valuation per household is, on average, 37 percent of the net present value of rural aggregate

consumption. Relative welfare losses are larger for the poorer segment of the displaced population and for reactive displacement.

The paper is organized as follows. Section 2 describes some facts about displacement in Colombia and provides hypothesis on the possible causes of displacement. In Section 3, we present a brief literature review on migration literature, discuss its relevance for modeling the displacement decision and present a random utility model for displacement. Section 4 presents the empirical results and Section 5 concludes.

2. Displacement in Colombia: Some Facts

2.1. Internally Displaced Population in Colombia

Violence in Colombia has continuously aggravated since the 1970s. Homicide rates tripled from 1970 till 1991, forced migration reached 4.3 percent of its population and the civil war covers today a sizeable portion of the country's territory. The roots of violence in Colombia are complex. Illegal trade, lack of punishment for criminals, the presence of illegal armed groups, poverty and inequality and decades of civil strife are among the most frequently identified sources of violence in Colombia (Vélez, 2002). However, the impact of violence differs between urban and rural areas. While urban areas suffer mostly from soaring homicide rates, the rural population endures armed confrontations, massacres and forced displacement.

Few studies estimate the social and economic costs imposed by violence in Colombia. In fact, behavioral responses to violence, which may inflict large welfare losses upon the civil population, are insufficiently analyzed. Gaviria and Vélez (2001) examine preventive responses of the Colombian urban population to escalation of crime. Nevertheless forced migration, the most extreme and extended behavioral response to violence in Colombia and other countries, has been largely ignored by the economic literature. Our paper seeks to understand

the causes of forced displacement and its associated welfare losses. This section describes some stylized facts about internally displaced population in Colombia.

Violence and displacement are apparently strongly linked. To explore this, we classified Colombian municipalities in four categories: (i) low incidence of displacement and low homicide rates; (ii) low incidence of forced displacement and high homicide rates; (iii) high incidence of forced displacement and low homicide rates; and (iv) high incidence of forced displacement and high homicide rates[3]. Table 1 shows high incidence of displacement and high homicide rates coincides in 57.8 percent of Colombian municipalities whereas municipalities with low incidence of forced migration also exhibit low homicide rates.

Table 1. Classification of Colombian municipalities according to displacement and homicide rates

		Displaced population	
		Low incidence	High incidence
Homicide rates	Low levels	66.1	42.2
	High levels	33.9	57.8

Source: authors calculations based on municipal data

The intensity and nature of the conflict determine this violence against civilians. On the one hand, when the conflict fuels, escalation of crimes against the civil population becomes a low cost and effective strategy to clear territories, allowing illegal armed groups to strengthen their control area, transport weapons, and develop at ease illegal activities. On the other hand, crimes against civilians are more frequent in contested areas with presence of antagonist armed groups. Crimes against civilians include death threats, massacres, forced recruitment, temporary town take-overs and selected homicides.

As a consequence, displacement is a nationwide problem. The need of illegal armed groups to have territorial strongholds heightened and expanded the conflict across the country. As a consequence, nearly 74 percent of Colombian municipalities receive or force out population and with the exception of one

[3] Municipalities are the smallest administrative unit in Colombia. Municipalities were considered to face high incidence of displacement or high homicide rates when its figures were above the national mean.

department[4], an island in the Caribbean Sea, all departments experience displacement problems.

Nevertheless, intensity of displacement[5] is heterogeneous across and within departments. For example, in the department exhibiting the largest displacement intensity ten percent of the population fled, while the department with the fifth highest intensity over four percent left (Figure 1). This wide variance across departments suggests regional characteristics partially determine displacement incidence.

Particular characteristics of households may trigger displacement as well. Some socio-demographic factors and the particular social context where the household reside may increase the likelihood of being victimized (i.e. landownership, age of household members or household insertion in the community). On the other hand, some households may be more risk averse and may prefer to leave their town to avoid being the victim of violence.

Social context dimensions, like the probability of being victimized in a particular geographical context, paired with victimization are seemingly important determinants of displacement. Presence of illegal armed groups appears to promote displacement. Figure 2 indicates displaced households resided in regions where paramilitary and guerrilla presence is strong while police and military presence is weak[6]. Facing violence, in particular, death threats to household members, pushes households to seek refuge elsewhere. Indirect violence, such as massacres in nearby towns or the murder of an acquaintance, is a source of displacement as well, but death threats play a stronger role (see Figure 3).

Some household characteristics may influence the likelihood of death threats, victimization and displacement. First, landowners are four times more inclined to

[4] Departments are equivalent to states.
[5] Intensity of displacement is measured as the number of displaced population per 100.000 inhabitants
[6] Presence of armed groups in the household' regions is defined as a dichotomous variable equal to one when households perceive the presence of that particular armed group.

flee their place of residence (see Figure 4). Apparently, illegal armed groups are interested in clearing territory and violently appropriating land. Second, other factors, like access to social services, elevate migration costs and incentive residents to stay in their hometown (see Figure 5).

2.2. What Causes Displacement in Colombia?

The causes of involuntary migration in Colombia are difficult to identify. Immediate causes or triggers are the last incident in a chain of events that produce the final decision to flee the hometown; yet the root of displacement underlies in the dynamics of the Colombian conflict. This section describes some hypothesis put forth in the literature about the sources originating displacement in Colombia.

Illegal armed groups and their actions against the civil population are mainly responsible for forced displacement. In 2001, paramilitary groups instigated half of forced migrations while guerrilla and simultaneous presence of two armed groups originated 20 and 22 percent respectively (RSS, 2002). Paramilitary groups not only bear the bulk of the responsibility, but also are more effective. During 2001, paramilitaries caused 599 displacement events that forced out 91.380 people meanwhile, guerrilla groups provoked 570 events that prompted 36.217 people to flee (RSS, 2002). Violent actions against the civil population, like threats and selective homicides, trigger the decision to migrate. However, armed confrontations (i.e. battles between paramilitary groups and guerrilla) became lately an important trigger due to the recent intensification of the conflict in populated areas (RSS, 2002).

Land conflicts and violent land appropriation are considered an underlying source of involuntary migration (Reyes and Bejarano, 1998). Land occupation is crucial in the war strategy to clear the territory from the presence of opponents, to expand control areas and to appropriate valuable land. This is particularly valid in contested territories where armed groups are attempting to establish hegemony.

As a result, displaced populations report having lost four million hectares of land[7], which amount to one third of productive land in Colombia (PMA, 2001).

Programs to eradicate illicit crops may also produce displacement. Aerial fumigation of illicit crops[8] destroys farmers' assets, produces a temporary shock to their income, and originates combats in the zone, exacerbating violence in the region. Estimations indicate 13.153 people were displaced during 1999 in drug producing departments (Puyana, 1999).

Forcing out population may be a war strategy to impede collective action, to damage social networks as well as to intimidate and control the civil population. Attacks on the population weaken their support for the opponent and obstruct rise ups of civil population (Henao et al., 1998). Lozano and Osorio (1999) estimate 65 percent of displaced population were active members of community organizations and 11 percent participated in labor and political organizations in their hometown.

Rural families may involuntarily migrate to avoid forced recruitment of their children into illegal armed forces. Children as young as eight years old are currently recruited by illegal armed groups to fight as soldiers in the Colombian conflict (Salazar, 2001). After a combat in October 2001, military forces found 43 percent of dead guerrilla members and 41 percent of captured guerrilla members were below 18 years of age (USCR, 2001).

3. Modeling Displacement as Migration

This section discusses migration theory and develops a theoretical model for forced displacement. But can a model developed for voluntary migration be applied to an involuntary action? Displacement is a reaction to a violent attack and not a voluntary decision: families are fleeing to save their lives and to protect

[7] Because displaced households have incentives to report ownership of larger farm sizes in the event a program of land restitution is implemented, these figures might overestimate the total hectares of abandoned land.

[8] Programs to eradicate illicit crops follow two strategies: (i) aerial fumigation of illicit crops; or (ii) manual and voluntary substitution. Some analysts consider aerial fumigation is causing displacement.

their assets. Nonetheless, we encounter that in towns with acute episodes of violence some people migrate to seek refuge while others prefer to stay.

Why would people enduring extreme violence episodes in their hometown prefer not to migrate? A possible hypothesis is that violence is not randomly targeted but aimed deliberately at certain groups of the population, forcing this people to migrate. An alternative hypothesis is that some households do engage in a decision-making process to analyze whether migration is the best possible option. During this process, besides considering security factors, families may contemplate traditional migration variables as well. Both reasons are not necessarily exclusive. Indeed, households may be targets of armed groups, but may prefer to stay on their hometown and not face dire conditions in unfamiliar and hostile cities.

We attempt to test whether displacement is caused solely by violence or whether traditional migration variables can play a role as well. This section first examines the traditional migration literature and discusses whether its salient conclusions are applicable to forced displacement. Second, it develops a random utility model that combines traditional migration variables with characteristics typical of forced displacement.

3.1. Comparing Migration and Displacement Incentives

When migrating voluntarily, households must compare the benefits and costs from residing in the origin and reception sites and choose the alternative with larger net benefits. In the case of displacement, violence is an additional factor in the decision process that modifies the costs from staying at the origin site; consequently, modifying the impact of other migration determinants. The purpose of this section is to analyze the variables identified in the literature as determinants of the migration decision and discuss that, in the presence of terror, traditional migration incentives may be outweighed by other factors or become less important. The impact of migration incentives are modified as violence reduces returns and increases risk in the site of origin particularly on individuals more prone to victimizations.

During the migration decision, individuals compare alternative locations and choose the one providing larger net benefits. Initial models (Sjaastad, 1962) formalized this idea by assuming individuals compared the difference in the present value of income streams minus the moving costs between alternative locations. Restraining benefits from migration to income streams limited the application of the migration model. Later versions of this model included other determinants of migration like the attractiveness of urban jobs *vis-à-vis* rural employment (Todaro, 1969). According to Todaro's model, individuals move searching for attractive job opportunities in urban areas.

Later refinements of these models discussed and extended reasons to migrate, which mainly affected benefits and costs of migration. First, contacts at the reception site and education mitigate migration costs (Becker, 1975; Todaro, 1989; Todaro and Maruszko, 1987). By providing housing, support in finding employment and a social network, contacts at the reception site diminish migration costs. Similarly, better-educated individuals may find employment more easily and generate larger incomes after migrating. On the other hand, potential discrimination at arrival increases migration costs; thereby, discouraging migration[9] (Fischer et al. 1997). Positive information about economic and social opportunities in the destination site improves the expected benefits from migration (Stark and Levhari, 1982; Dustmann, 1992; Maier, 1985). Conversely, information about poor social and economic conditions in destination sites raises the benefits of non-migration.

The length of the planning horizon exerts similar incentives on the decision to migrate and to displace, but the underlying motive differs. Since discounted benefits are larger, inclination to migrate is stronger for individuals with longer planning horizons (Becker, 1975; Todaro, 1989; Todaro and Maruszko, 1987). In the case of displacement, young people are probable targets of threats, forced

[9] In Colombian urban centers, discrimination against displaced population is particularly strong. Some native residents wrongly believe displaced households belong to illegal armed groups and, in addition, perceive this population diverts public resources previously allocated for the poor.

recruitment and selective homicides; therefore, increasing their likelihood to displace.

Risk aversion plays an asymmetric role in the decision to migrate and to displace. The uncertainties inherent in arriving to an unknown place may dissuade risk averse individuals to migrate (Fischer et al., 1997). Violence, in contrast, may induce risk averse households to displace in spite of the complications they might cope with in the reception site.

Standard migration literature considers that location specific assets render migration costly, reducing incentives to migrate (Fischer et al, 1997). However, those incentives might be reversed in an environment of deficient rule of law that allows illegal armed groups to violently appropriate land -particularly when left unprotected. Under these special circumstances, landownership becomes a possible factor of victimization, causing displacement. Similarly, when the destruction of social networks is a war strategy, human capital turns into a risk factor. Analogously, permanent residency and active participation in community activities signify advantages when belonging to a society; discouraging migration to the extent that it would entail giving up these accumulated advantages (Fischer et al., 1997). But, if destruction of social networks is a war strategy, high levels of social capital is no longer an asset but a risk factor.

Because an armed conflict changes the benefits and costs from staying in the origin site or leaving to a destination, and their distribution across households' characteristics at the origin site, the standard results of the migration literature should not remain unchanged. On the one hand, contacts at reception site, education, discrimination and the planning horizon determine migration and displacement in the same direction. Violence, on the other hand, modifies the impact of access to information, risk aversion, and location specific assets on the migrating decision.

Empirical evidence on the impact of violence on migration is scarce and relies solely on aggregated figures. Schultz (1971) explores the causes of internal migration rates in Colombia and finds violence, measured as the number of

deaths per year, is associated with net out-migration. Estimates of the determinants of migration rates in Guatemala reveal political violence is a key determinant of migration decisions in that country (Morrison and May, 1994).

3.2. A Random Utility Model for Displacement[10]

Households displace when the expected utility from migrating is greater than the utility from staying at the origin site. Choices are based on many dimensions influencing household welfare. First, households examine violence levels in both sites and evaluate the risk the family will face when staying. Second, displaced families compare the economic opportunities in both places. Third, migration costs are assessed; the migration process demands economic and social investments, like loosing access to social services and leaving behind location-specific assets. Lastly, socio-demographic characteristics shape preferences of the household. Household *i* decides whether to migrate if the utility from displacement is greater than the utility from staying in the origin site

$$U_{id} > U_{in}. \quad (1)$$

where U_{ij} denotes the indirect utility from alternative *j*, *j=d* is the reception site and *j=n* is the origin site. The indirect utility is composed by the deterministic utility (v_{ij}) and a random term (ε_{ij}) with mean zero

$$U_{ij} = v_{ij} + \varepsilon_{ij}. \quad (2)$$

Decision to displace or remain in the origin site depends on many factors. First, households evaluate risks and generate expectations about security in the origin and destination region (S_{ij}). Second, households compare income possibilities and access to social services in both sites (Y_{ij}). Third, migration and information costs influence the decision process (C_{ij}). Finally, household characteristics reflecting preference on needs and risk aversion determine displacement behavior (Z_i). The observable utility is defined as

[10]This model was developed in Kirchhoff and Ibáñez (2001).

$$v_{ij} = \alpha S_{ij} + \beta_j Y_{ij} + \delta C_{ij} + \gamma_j Z_i. \quad (3)$$

Household *i* displaces when the expected utility from displacement is greater than the expected utility from staying in the origin site

$$prob_i(displace) = prob_i(\alpha S_{id} + \beta_d Y_{id} + \delta C_{id} + \gamma_d Z_i + \varepsilon_{id} > \alpha S_{in} + \beta_d Y_{in} + \delta C_{in} + \gamma_n Z_i + \varepsilon_{in}). \quad (4)$$

If we assume a logistic distribution for the error term and a linear utility function, the probability of displacement is

$$prob_i(displace) = \frac{\exp[\alpha(S_{id} - S_{in}) + \beta_d Y_{id} - \beta_n Y_{in} + \delta(C_{id} - C_{in}) + (\gamma_{id} - \gamma_{in})Z_i]}{1 + \exp[\alpha(S_{id} - S_{in}) + \beta_d Y_{id} - \beta_n Y_{in} + \delta(C_{id} - C_{in}) + (\gamma_{id} - \gamma_{in})Z_i]}. \quad (5)$$

Perceptions of security can be approximated with variables indicating whether the household was directly threatened and whether the household is facing indirect violence. Direct threats are however not randomly targeted. Aggressions against the civil population are a consequence of war and not an accidental by-product of the civil conflict (Cairns, 1997). Deliberate attacks to civilians seek to depopulate territory in order to obtain the loot or to reduce the fighting capacity of the enemy. A careful designed strategy to appropriate assets, extract natural resources at ease and prevent civilians from rising up, implies targeting particular groups of the population like landowners, active members of the community or young household heads. The probability of being the victim of a direct threat is defined by

$$\Pr ob_i(Threat) = f(L_{in}, V_{in}, A_{in} \mid Z_i), \quad (6)$$

where L_{in} denotes landownership in the place of origin, V_{in} represents ties in the place of origin and A_{in} is a dichotomous variable indicating the presence of armed actors in the place of origin.

Presumably, households confront large welfare losses from forced migration. First, assets, like land, are often abandoned because households have to flee hastily to protect their life and, most of the times, do not have legal property of

the land[11]. Second, since displaced households are mostly rural and are trained to compete in rural markets, returns to human capital are lower after migration to urban areas. Third, access to health services and education are not easily regained in reception sites. This implies loosing the fix costs invested to access such services and, even worst, interrupting education. Lastly, the sequels of post-traumatic syndrome, as a consequence of victimization, can hinder normal capabilities of displaced households. These losses, although partially manifested in monetary terms, are likely to be one of the most significant costs of displacement for the Colombian society. If these costs to the displaced themselves are left out in evaluating the dimension of the problem, the policies implemented to alleviate displacement might still be insufficient.

We will estimate welfare losses from displacement based on methods used widely in environmental economics. The shock from displacement exhibits a similar structure to environmental problems. An external shock, in this case violence, induces changes in behavior, which in turn impose welfare losses to households. One way of measuring changes in utility in monetary units is compensating variation[12]. In this case, compensating variation can be interpreted as a measure of the willingness to accept income in exchange of deterioration in security conditions. As shown by Hanemann (1982), compensating variation (CV) can be defined as the measure that equates the expected maximum utility before and after the displacement. For the model explained above, expected compensating variation can be defined as[13]

$$E[CV_i] = \frac{\alpha(S_{in} - S_{id}) + \beta_n Y_{in} - \beta_d Y_{id} + \delta(C_{in} - C_{id}) + (\gamma_{in} - \gamma_{id})Z_i}{\beta_n}$$

The theoretical contributions of the model defined above are twofold. First, the random utility model permits to introduce variables never considered in migration models, like perceptions of security, and to establish behavioral responses to

[11] Ibáñez and Querubin (2004) found near 53 percent of displaced households had legal title of their land, the remaining households had informal access to land.

12 Compensating variation for avoiding displacement is the amount of money necessary to leave the individual indifferent between displacing and staying in his hometown.

[13] A complete derivation of the compensating variation is presented in Appendix I.

violent events. Second, the definition of welfare losses allows policy makers to decide whether intervention is necessary and establishes an upper bound for investment funds to mitigate displacement. The random utility model defined above, typically used in environmental and transport economics, allows us to retrieve the parameters of the utility function and, thereby, to estimate welfare losses.

4. Determinants of Displacement in Colombia and Associated Welfare Losses

4.1. The Data

The purpose of the Survey for Internally Displaced Population[14] (SIDP-2000) was to identify the causes of displacement in Colombia. Surveys were conducted in origin and destination sites in order to have information about displaced households and households who did not displace despite living in conflict zones - hereafter non-displaced households. Two samples were constructed: a displaced and a non-displaced sample. The questionnaires administered to these households covered issues that ranged from socio-economic characteristics of the household, victimization profile, armed actors in the region, access to social services in the origin and destination site, land ownership and agricultural production.

The sample for displaced households was selected in destination sites with the largest influxes of displaced population during 1999. The surveys were administered to 200 displaced households in Bogotá, Cartagena and Medellín. Distribution of the sample among the three cities was chosen according to the aggregate numbers of displaced population in each one. Questionnaires were applied only to households displacing from Antioquia and Cordoba, the departments with the highest records of population expulsion in 1999. The regional composition of the displaced sample was intentionally chosen with the objective of building a counterfactual sample of non-displaced population with a

[14] A detailed description of the survey can be found in Kirchhoff and Ibáñez (2001).

similar regional composition. Since displaced households are clustered in specific neighborhoods in each city, households included in the sample were randomly chosen in these neighbors. Before interviewing a household, the enumerator asked two screening questions. The first question elicited whether the household was indeed forced to migrate due to violence and the second question asked about the site of origin. The non-displaced sample was composed of 176 surveys of households residing in conflict zones traditionally affected by displacement and located in Antioquia and Cordoba. The size and distribution of the non-displaced sample was chosen according to displacement figures by municipalities. Households in each expulsion municipality were randomly chosen. Although the survey provides valuable information about forced displacement in Colombia, the sample was not representative of the displaced population; therefore, results cannot be generalized.

As described above, the sample was constructed based on choices – displacement and non-displacement – rather than on decision-makers. As such, an exogenous sampling process, where decision makers are selected and their choices observed, was not followed. Choice based sample, if not treated adequately, render biased parameter estimates. To address this problems, weights defined by Manski and Lerman (1977) were calculated and use to calculate descriptive statistics as well as to estimate the regressions.

To construct the weights for the displaced sample $\left(w_i^d\right)$, we calculated the fraction of the displaced population selecting each municipality where the survey was conducted $\left(Q_i^d\right)$[15] and the analogous fraction for the choice based sample $\left(H_i^d\right)$. The weight applied to contribution *i* of the log-likelihood for the displaced sample is

$w_i^d = Q_i^d / H_i^d$.

The weight for the non-displaced sample $\left(w_i^{nd}\right)$is

[15] These figures are available at www.red.gov.co.

$$w_i^{nd} = Q_i^{nd} \big/ H_i^{nd}$$

where Q_i^{nd} represents the fraction of the population that stayed in the municipality where the survey was conducted and H_i^{nd} the analogous fraction for the choice based sample. By weighting each contribution of the log-likelihood by these weights, we obtain unbiased parameter estimates.

Table 1 presents the weighted descriptive statistics for the displaced and non-displaced sample. The descriptive statistics provide some initial insights on displacement behavior. First, displaced and non-displaced households are exposed to high violence levels. Near 78 percent of displaced households and nine percent of non-displaced households faced direct threats in the origin site. Moreover, few households have not confronted indirect violence[16]: 99 percent of displaced households and 75 percent of non-displaced households reported being victims of indirect violence. Second, non-displaced households feel more protected by government forces. In contrast to non-displaced households, displaced households perceive a greater presence of paramilitary and guerrilla in their hometown and a weaker presence of police forces. Third, evidence suggests violence is not randomly targeted. Displaced households are landowners in larger proportions, are headed by younger heads, and have larger consumption aggregates[17] than non-displaced households. Land size, however, is larger for non-displaced households, which may imply that illegal armed groups mostly target landowners with small farms or that the opportunity cost from abandoning large land plots is larger. Lastly, non-displaced apparently have a higher access to public investment because they are better educated and have more access to basic social services[18] when compared to displaced households.

[16] A household was defined to confront indirect violence when a nearby town or when friends and family were the victims of attacks by illegal armed groups, massacres, bombs or any other type of violence.

[17] Appendix I describes the methodology used to predict rural and urban aggregate consumptions.

[18] Access to basic social services is a dummy variable equal to one when the household has access to education and health.

Table 1. Descriptive Statistics [a]

Variable	Displaced		Non Displaced	
	Mean	Variance	Mean	Variance
Direct threat	0.78		0.09	
Indirect violence	0.99		0.75	
Paramilitary presence	0.97		0.66	
Guerilla presence	0.96		0.50	
Military presence	0.92		0.90	
Police presence	0.58		0.90	
Contacts – reception site	0.87		0.74	
Years of residence – origin site	15.53	4.10	21.01	1.04
Own land	0.80		0.06	
Standardized land size	-0.22	0.12	0.01	0.02
Access to social services	0.34		0.91	
Household education	7.37	0.49	9.01	0.30
Access to media	2.79	0.42	3.35	0.11
Rural annual consumption [b]	1.37	0.11	1.28	0.07
Urban annual consumption [b]	2.14	0.29	1.51	0.08
Age household head	33.71	1.98	43.93	1.11
Male household head	0.90		0.60	
Number of organizations	0.26	0.13	0.27	0.04

Source: Authors calculations based on SIDP-2000
a. Calculated using Manski weights
b. In million pesos

4.2. Estimation results

Aggressions against the civil population are not randomly targeted. The previous section provides evidence that illustrates that illegal armed group may attack households with particular characteristics; consequently, direct threats are endogenous. In order to reduce endogeneity problems, we estimate the reduced form for the probability of being the victim of a death threat and the probability of displacement. Because finding a variable determining the probability of direct threats but not the probability of displacement was difficult, we did not use the instrumental variable approach.

4.2.1. The Probability of Being a Victim of a Death Threat

Table 2 reports the results for the probability of being victim of a death threat. The most likely to be victims of direct threats are large landowners, families with young household heads and female headed households. Conversely, families with larger consumption aggregates are less likely to be terrorized, probably because they are better able to adopt defensive measures against illegal armed groups. These results confirm the hypotheses developed in the literature about

displacement in Colombia: illegal armed groups violently appropriate land and threat young members of the community as part of a war strategy. Surprisingly, the number of organizations, a proxy for leadership of the household in the community, is significant, but decreases the odds of being threatened. Two interpretations are possible. On the one hand, illegal armed groups may target leaders in the community and the number of organizations is not a measure of leadership. On the other hand, membership to organizations can provide protections to its members, reducing the probability of victimization.

Estimations indicate as well that households residing in zones of paramilitary presence are threatened with a larger probability whereas guerrilla presence does not seem to have a significant effect on threats. This result should be carefully analyzed. When the SIDP-2000 survey was conducted, displacement occurred mainly as a consequence of paramilitary actions like threats and massacres. Nevertheless, the dynamics of the conflict changed significantly during the last years and today guerrilla groups are responsible for many displacement events. Lately, guerrilla attacks to small and medium municipalities have provoked large expulsions of population[19].

Police protection deters threats from illegal armed groups to the population, preventing displacement, whereas military presence does not reduce the likelihood of threats. This is not surprising, as protection of the civil population requires a constant presence of the State and a reliable institution with strong links to the community. While the police force embodies those conditions, the role of military forces is, to protect the population during armed conflict. Thus, the presence of the latter should not be expected to be permanent in each Colombian municipality.

[19] For example, in May 2002 leftist guerrilla groups attacked Bojayá, a small municipality located on the Pacific Ocean. As a result of the attack, 119 people died and 4.284 people were forced to displace (CE, 2002). This it the best known episode of an uninterrupted sequence of armed groups attacks against civilians, up to 2005.

Table 2. Probability of Threats – Reduced form [a]

Variable	Coefficient Estimate (t-stat)
Indirect violence	-0.8100
	(-1.00)
Presence of Military forces	0.7161
	(1.33)
Presence of Police forces	-1.7135
	(-3.63)***
Presence of paramilitary groups	1.5122
	(2.21)**
Presence of guerrilla groups	1.1227
	(1.56)
Contact at reception site	-0.6790
	(-1.51)
Access to media	0.5406
	(3.02)***
Years of residence – origin site	-0.0124
	(-0.75)
Land ownership	0.2962
	(0.64)
Standardized land size	1.5118
	(2.92)***
Access to social services	-0.9243
	(-2.00)**
Household education	0.1401
	(1.83)*
Rural consumption per capita [b]	-0.0039
	(-4.37)***
Urban consumption per capita [b]	0.0024
	(4.60)***
Age household head	-0.0112
	(-0.61)
Male household head	-1.4209
	(-2.54)***
Number of organizations	-0.4754
	(-2.02)**
Number of observations	345
Pseudo R-square	0.6435

Source: Authors calculations based on SIDP-2000
a. Estimated using Manski weights
b. In thousand pesos
* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

4.2.2. Determinants of Displacement

The displacement model defined in section III is estimated using maximum likelihood procedures. Three models are estimated. The first is the Aggregated Model that makes no distinction between preventive and reactive displacement.

In the next section, we estimate a model distinguishing preventive from reactive displacement.

Table 3 reports estimation results for the Aggregated Model. Variables capturing security perception are significant and their coefficients are large, implying Security perceptions are the dominant predictor of displacement. The occurrence of indirect violence pushes household to flee their hometown. While military and police presence dissuade displacement, the existence of illegal armed groups – paramilitary or guerrilla – promotes displacement.

Displacement costs, though significant, do not counterbalance the effects of violence in the origin site. Households with access to basic social services are less likely to displace. Access to media dissuades displacement, probably by providing information about difficulties families face in reception sites, dissuades displacement. However, the joint effect of both variables is not enough to compensate the influence of indirect violence let alone the presence of illegal armed groups in the region. Surprisingly, contacts availability at reception, which reduces migration costs, is not statistically significant.

Consumption indicators in the displacement decision behave similarly to those in migration models. Foregone consumption in the origin site decreases the chances of displacement while consumption opportunities in the destination site induce displacement. Unlike results in traditional migration models, better-educated household are less willing to displace; probably better off households are able to adopt protective measures or have more accurate information regarding the opportunities in reception sites and prefer not to displace.

Household characteristics partially determine the decision to displace. Households with younger heads are more inclined to displace. As previously discussed, young individuals are likely to be possible targets of illegal armed groups. In addition, the tendency of younger heads to migrate may reflect risk preferences of households and is a standard result in the migration literature.

Risk variables, like land ownership and insertion of the family in the community, are push factors. First, land ownership, which was not statistically significant for the direct threat estimations, is positive and significant, showing land owners are targeted by illegal armed groups. Second, years of residence, an imperfect proxy for the thickness of the households' insertion in the community, and the number of organizations increase the probability of displacement. Because the regression estimates the reduced form coefficients, these three variables may be capturing the deliberate targeting of community leaders by illegal armed groups.

Table 3. Probability of Displacement – Reduced Form [a]

Variable	Coefficient Estimate (t-stat)
Indirect violence	2.4112
	(3.77)***
Presence of Military forces	-2.0446
	(-4.04)***
Presence of Police forces	-3.7317
	(-4.49)***
Presence of paramilitary groups	4.3127
	(5.89)***
Presence of guerrilla groups	2.1658
	(5.77)***
Contact at reception site	0.4831
	(1.56)
Access to media	-0.4316
	(-3.57)***
Years of residence – origin site	0.0303
	(2.82)***
Land ownership	1.4728
	(3.05)***
Standardized land size	0.0510
	(0.28)
Access to social services	-1.6638
	(-3.92)***
Household education	-0.1349
	(-4.22)***
Rural consumption per capita [b]	-0.0032
	(-4.75)***
Urban consumption per capita [b]	0.0023
	(3.81)***
Age household head	-0.0835
	(-5.77)***
Male household head	-0.3281
	(-1.21)
Number of organizations	1.0670
	(3.90)***
Number of observations	345
Pseudo R-square	0.6665

Source: Authors calculations based on SIDP-2000

a. Estimated using Manski weights
b. In thousand pesos
* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Empirical estimation confirms violence modifies the benefits and costs of migration when life threats, lack of rule of law and violation of property rights prevail. Violence and aggressions against the civil population modifies the migration incentives of education and location specific assets, like land and social capital. Other migration determinants, like consumption indicators and access to basic social services, influence displacement decisions in the expected direction.

Military and police protection reduce displacement although in different stages of the process. Police protection is paramount to ease aggressions of illegal armed groups to the civil population. Once aggressions against the civil population faces unfold, military and police presence are important instruments to halt displacement.

4.3. Modeling Two Displacement Types: Preventive and Reactive

The previous model is now estimated for preventive and reactive displacement. We refer to preventive displacement when households identified "fear despite not being threatened" as reason for fleeing their hometown. Results for the preventive and reactive model are presented in Table 4.

Perceptions of security variables are similar in the preventive and reactive displacement models. Indirect violence continues to be an important determinant of displacement. Presence of government forces and illegal armed groups are also significant for both models, but are stronger for preventive displacement. These results may suggest the more risk averse self-select into preventive displacement since the mere presence of illegal armed groups prompts displacement, despite not being the victim of a threat.

Traditional migration determinants are stronger for preventive displacement. Educations of household heads, consumption aggregates, access to social

services, although significant for both models, are much stronger for preventive displacement. Moreover, contacts at reception site, which were not significant for the aggregate model, are positive and significant for preventive displacement. When households displace preventively, the decision-making process is less hasty, allowing families to assess benefits and costs of migration. As a result, traditional migration variables are more important *vis-à-vis* reactive displacement.

On the other hand, the influence of access to media and years of residence is different to reactive displacement in contract to preventive displacement. Access to media is a deterrent for reactive displacement whereas is not significant to halt preventive displacement. Furthermore, the impact of access to media to reduce displacement outweighs variables like access to social services and presence of military forces. Possibly, the perspective of facing dire conditions in reception sites is an effective instrument to deter reactive displacement. Years of residence, while negative for preventive displacement, is positive for reactive displacement. The former might indicate the migration costs of leaving behind the web of social networks when migrating, whereas the latter may denote, as explained previously, insertion of the household in the community and, as a consequence, a higher risk of victimization.

Table 4. Probability of Displacement – Preventive and Reactive Displacement [a]

Variable	Preventive displacement Coefficient Estimate (t-stat)	Reactive Displacement Coefficient Estimate (t-stat)
Indirect violence	2.4971 (2.50)***	3.2084 (5.53)***
Presence of Military forces	-2.0451 (-2.79)***	-1.6154 (-2.18)**
Presence of Police forces	-6.1604 (-4.59)***	-3.7243 (-1.73)*
Presence of paramilitary groups	6.0322 (5.30)***	4.2573 (2.51)**
Presence of guerrilla groups	2.4596 (4.57)***	2.2600 (6.13)***
Contact at reception site	1.3662 (3.00)***	0.1268 (0.41)
Access to media	-0.2676 (-1.28)	-0.4667 (-3.65)***
Years of residence – origin site	-0.0325 (-1.93)**	0.0342 (2.63)**
Land ownership	3.4900 (3.97)****	0.7608 (1.90)**
Standardized land size	0.5517 (1.89)**	-0.3551 (-1.20)
Access to social services	-3.6541 (-2.58)***	-1.0627 (-2.37)**
Household education	-0.1789 (-2.06)**	-0.1471 (-3.06)**
Rural consumption per capita [b]	-0.0061 (-4.88)***	-0.0026 (-2.49)**
Urban consumption per capita [b]	0.0046 (4.46)***	0.0021 (2.28)**
Age household head	-0.1408 (-3.64)***	-0.0754 (-4.81)***
Male household head	-1.2832 (-2.97)***	-0.3837 (-1.30)
Number of organizations	1.3777 (3.53)***	1.0090 (3.23)***
Number of observations	233	281
Pseudo R-square	0.7665	0.6954

Source: Authors calculations based on SIDP-2000
a. Estimated using Manski weights
b. In thousand pesos
* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Empirical findings show violence, security perceptions, migration costs and traditional migration variables remain significant for both types of displacement. However, the behavior of preventive and reactive types is partially different. Security perceptions and traditional migration variables exert a stronger influence

on preventive displacement, implying preventive displacement allows families to analyze better the benefits and costs from forced migration.

4.5. Welfare Losses

Welfare losses are estimated using the parameters from the probability of displacement for the aggregated model, the preventive model and the reactive model. Welfare losses are calculated for each household by incorporating the characteristics of the household on the definition for compensating variation derived in Appendix I. Welfare losses are presented as the percentage of the net present value of rural aggregate consumption[20]. To estimate the net present value of rural aggregate consumption, we assume the remaining life span of the household after displacement is equal to life expectancy in rural areas minus the age of the household head. Life expectancy is differentiated by gender.

Welfare losses from displacement are substantial. In fact, the costs from displacement amount to 37 per cent of the net present value of aggregated rural consumption (See Table 5). Figure 6 shows the cumulative distribution of welfare losses as a percentage of net present value of rural aggregate consumption. Nearly 80 percent of households experience welfare losses above 40 percent of the net present value of the aggregated rural consumption.

Table 5. Welfare Losses as Percentage of Lifetime Household Consumption*

Mean and Standard Deviation

	% of Lifetime Consumption Mean (s.d)
Aggregated Model	37% (66%)
Preventive Displacement	20% (37%)
Reactive Displacement	33% (55%)

Source: Authors calculations based on SIDP-2000
Note: (*) Net present value

[20] The estimation of aggregate consumption and the net present value of rural aggregate consumption is presented in Appendix II.

When welfare losses are estimated for preventive and reactive displacement, we find preventive displacement generates lower welfare losses, 20 per cent, in contrast to reactive displacement, 33 per cent (Table 5). Because preventive displacement allows families to mitigate the impact of migration by selling assets, protecting land and contacting family and friends in receptions sites, welfare losses are lower.

The economic burden of displacement is higher for poor households. Figure 7 plots the average welfare losses as a percentage of lifetime consumption per rural consumption quartile[21]. Welfare losses as a percentage of lifetime consumption decrease significantly as households are better off, with a particular steep decline for households located in the fourth quartile. While displaced households located in the first and second consumption quartile confront median losses near to 72 and 41 percent of lifetime consumption, welfare losses for households located in the fourth quartile average approximately 6 percent. Moreover, Figure 7 shows larger dispersion of welfare losses among poor households and more frequent cases of extremely high welfare losses.

Unfortunately, the economic literature does not provide similar estimations to compare the size of welfare losses from displacement in Colombia. However, comparisons with estimates of the costs disease or crime show that the burden of displacement for the victims is much higher. Total economic losses to victims of crime, including medical costs and lost work time, during 1992 in the United States were measured in $532 per crime (Klaus, 1994). Levitt (1995) obtains a much higher estimate as the cost of pain, suffering and economic loss for the average crime in the United States around $3.000 in the US, equivalent at most to 12 per cent of GDP per capita. Londoño (1998) calculates human capital losses in Colombia originating from violence around four percent of GDP each year. Other points of comparison are Rubio's (1997) estimate of total household expenditures on protection and security, which amounts to 1.4 percent of the Colombian GDP, and the total burden of disease per year in Latin America that

[21] Per capita consumption quartiles for rural areas were calculated using the ECV-1997.

amounts to 0.2 Disease Adjusted Life Years –DALYs- per person. In summary, displaced populations show a comparatively high index of vulnerability, when compared to other types of risks that are addressed by publicly funded programs.

4. Conclusions

Forced displacement modeling diverges from traditional migration modeling. Many key determinants of migration have the opposite effect in the context of forced displacement. Our empirical findings confirm this hypothesis. Violence at the origin site modifies the migration incentives of education and location specific assets, like land and social capital.

Large welfare losses justify policy intervention. Economic costs of displacement are in average 40 per cent of the net present value of aggregated rural consumption. Moreover, poorer families experience larger welfare losses. In fact, some households present welfare losses above 80 percent of the net present value of aggregated rural consumption.

Our estimations provide evidence on possible policy instruments to prevent displacement. Violence and security perceptions are the major determinants of displacement and are, thereby, the key instrument in preventing displacement. Other interventions have a marginal effect on displacement and cannot compensate the effect of direct threats and indirect violence. However, police and military protection can mitigate displacement. While police presence prevents direct threats, military and police presence are instrumental to protect the population once displacement is imminent. On the other hand, economic variables, like access to basic social services or access to information, mildly prevent displacement.

The link between access to land and displacement merits a separate discussion. By increasing the probability of being the victim of a threat and the odds of displacement, access to land constitutes a risk factor. Deliberate attacks to civilians seek to depopulate territory in order to obtain the loot, to reduce the fighting capacity of the enemy, to expand control areas and to appropriate

valuable land (Azam and Hoefler, 2002, Reyes and Bejarano, 1998). Policies to strengthen property rights, like granting land titles, or to solve land conflicts, like redistribution of land, could decrease the pressure of armed groups upon landowners, preventing therefore displacement.

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APPENDIX I

Derivation of Compensating Variation[22]

The utility from displacement for household *i* is defined as

$$U_{id} = \alpha S_{id} + \beta_d Y_{id} + \delta C_{id} + \gamma_{id} Z_i + \varepsilon_{id} .$$

On the other hand, the utility for household *i* from residing in the origin site is

$$U_{in} = \alpha S_{in} + \beta_n Y_{in} + \delta C_{in} + \gamma_{in} Z_i + \varepsilon_{in} .$$

The money value necessary to equate the utility before and after displacement is equivalent to

$$\alpha S_{id} + \beta_d Y_{id} + \delta C_{id} + \gamma_{id} Z_i + \varepsilon_{id} = \alpha S_{in} + \beta_n \left(Y_{in} - CV_i\right) + \delta C_{in} + \gamma_{in} Z_i + \varepsilon_{in} ,$$

which becomes

$$CV_i = \frac{\alpha(S_{in} - S_{id}) + \beta_n Y_{in} - \beta_d Y_{id} + \delta(C_{in} - C_{id}) + (\gamma_{in} - \gamma_{id}) Z_i + \varepsilon_{in} - \varepsilon_{id}}{\beta_n} .$$

Since ε_{id} and ε_{in} are random variables with mean zero, the expected compensating variation is defined as

$$E\left[CV_i\right] = \frac{\alpha(S_{in} - S_{id}) + \beta_n Y_{in} - \beta_d Y_{id} + \delta(C_{in} - C_{id}) + (\gamma_{in} - \gamma_{id}) Z_i}{\beta_n} .$$

[22] The derivation of the compensating variation draws on Hanemann (1984).

APPENDIX II

Prediction of consumption aggregate

To estimate the consumption aggregate of SIDP-2000 households, we estimated a regression for the micro determinants of consumption for urban and rural areas utilizing the Encuesta de Calidad de Vida (1997). The coefficients from the estimation were used to predict urban and rural consumption for displaced households. To estimate the net present value of rural aggregate consumption, we assume the remaining life span of the household after displacement is equal to life expectancy in rural areas minus the age of the household head. Life expectancy is differentiated by gender. According to the World Health Organization life expectancy in the Colombian rural areas is 76.3 years for women and 67.5 for men. A discount rate of 9.5% was used.

Based on Wodon (1999) and the results for Vélez (2002), we included the following determinants of consumption included: (i) regional controls; (ii) household size variables: the number of babies, children and adults; (iii) other demographic and gender variables such as gender and age of household head as well as family structure; (iv) education variables: education of the household head and education of the spouse; and (v) the standardized amount of land owned for rural areas. Results for the urban and rural estimation are presented in Tables II.1 and II.2.

Table II.1. Estimate for log of rural consumption

Variable	Coefficient estimate (t-statistic)
Number of children under 2 years	-0.0810 (-1.32)
Number of children under 2 years squared	0.0310 (0.75)
Number of children between 3 and 13 years	0.0324 (1.69)*
Number of children between 3 and 13 years squared	-0.0027 (-0.73)
Number of adults (14-65)	0.1989 (9.07)***
Number of adults (14-65) squared	-0.0119 (-3.44)***
Age household head	0.0093 (2.16)**
Age household head squared	-0.0001 (-3.37)***
Male household head	0.0975 (2.47)***
Years of education household head	0.0326 (3.74)***
Years of education household head squared	0.0005 (0.70)
Years of education spouse	0.0274 (3.20)***
Years of education spouse squared	0.0005 (0.83)
No spouse	-0.0623 (-1.70)*
Standarized land size	-0.0137 (-0.61)
Constant	14.4613 (85.91)***
Adjusted R-Square	0.3029
F Test	18.34

Source: Authors calculation based on Encuesta de Calidad de Vida (1997)

*Municipal controls included

* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

Table II.2 Estimate for log of urban consumption

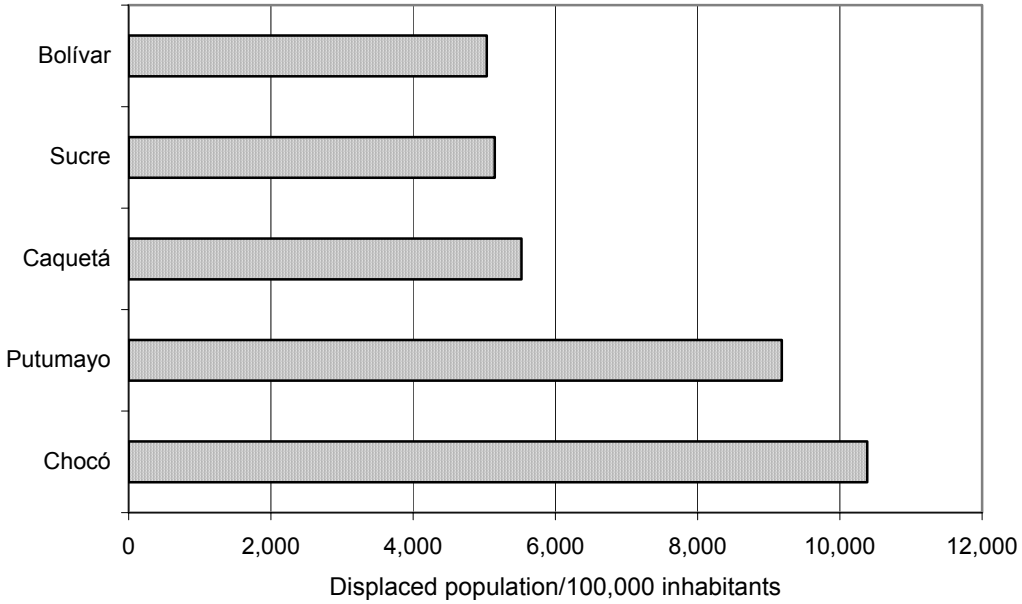
Variable	Coefficient estimate (t-statistic)
Number of children under 2 years	-0.112* (-1.77)
Number of children under 2 years squared	0.0567 (1.27)
Number of children between 3 and 13 years	0.0146 (0.72)
Number of children between 3 and 13 years squared	0.0000 (0.00)
Number of adults (14-65)	0.2137 (11.74)***
Number of adults (14-65) squared	-0.0173 (-5.96)****
Age household head	0.0183 (4.78)***
Age household head squared	-0.0002 (-5.63)***
Male household head	0.1758 (5.23)***
Years of education household head	-0.0020 (-0.31)
Years of education household head squared	0.0024 (7.00)***
Years of education spouse	0.0001 (0.02)
Years of education spouse squared	0.0019 (5.27)***
No spouse	-0.0155 (-0.45)
Constant	14.5217 (135.29)***
Adjusted R-square	0.3956
F Test	32.93

Source: Authors calculation based on Encuesta de Calidad de Vida (1997)

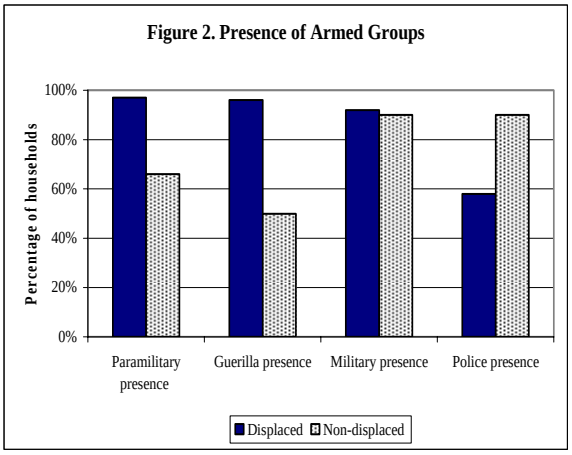
*Municipal controls included

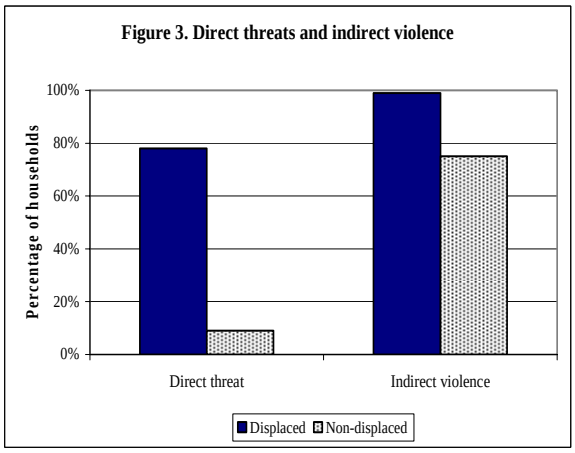
* Significant at 10% level
** Significant at 5% level
*** Significant at 1% level

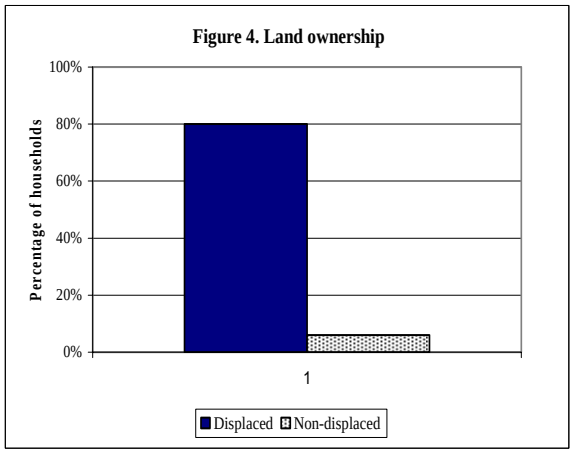
Figure 1. Displacement Intensity by Department 2002

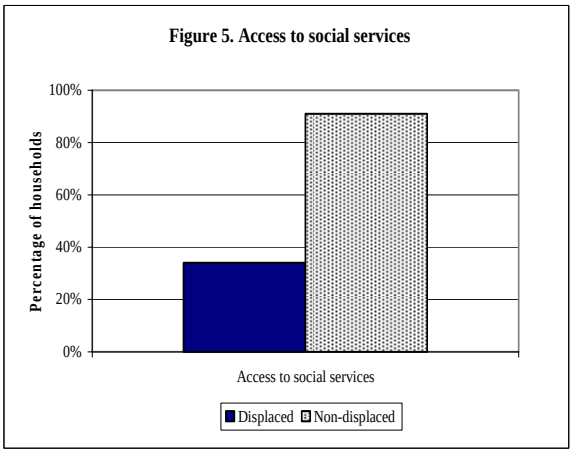


Source: Ibáñez and Vélez (2003)



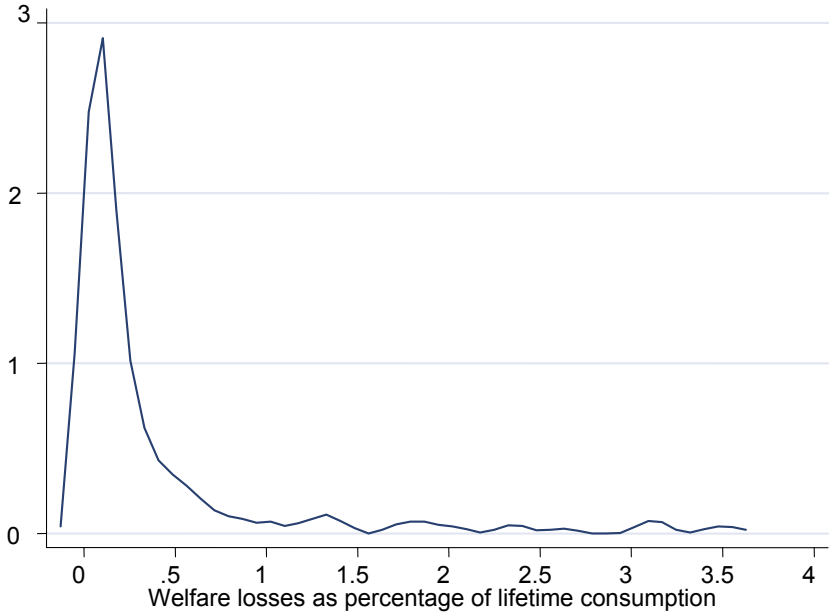






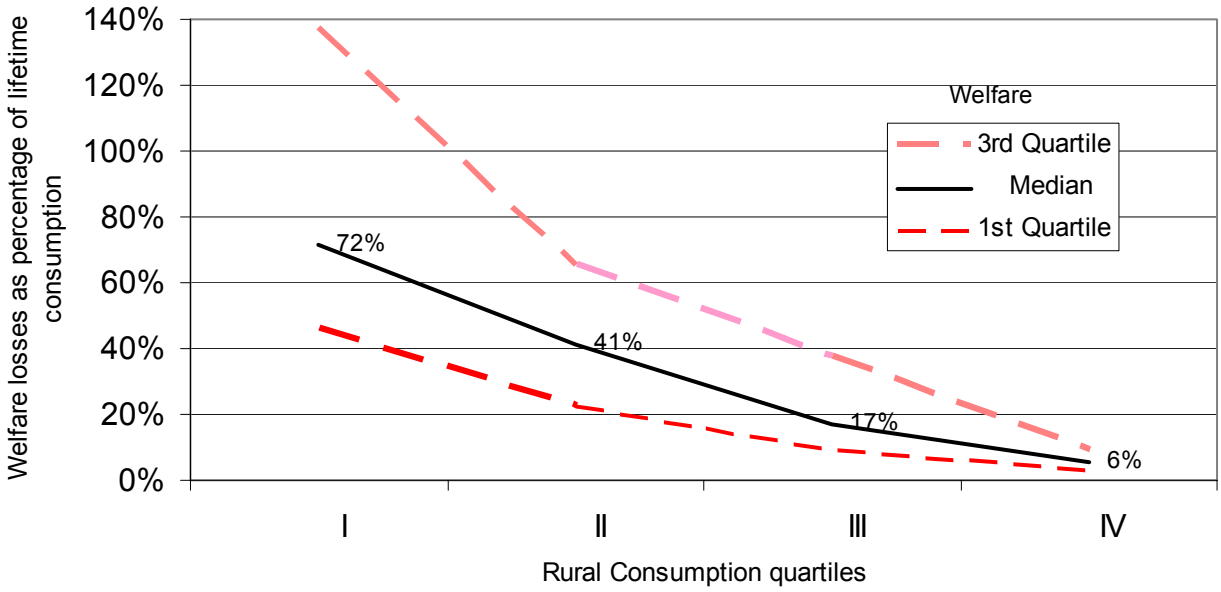
Source: SIDP-2000

Figure 6. Kernel Density for Welfare Losses as a Percentage of Lifetime Consumption



Source: Authors calculation based on SIDP - 2000

Figure 7. Welfare losses by household and consumption quartile



Source: Authors calculations based on SIDP-2000

Note: Income distribution quartiles are calculated from ECV 1997 for rural areas.